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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/827,289	04/20/2004	Tomohiro Sugimoto	2004_0587A	2658

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WENDEROTH, LIND & PONACK, L.L.P.  
2033 K STREET N. W.  
SUITE 800  
WASHINGTON, DC 20006-1021

EXAMINER

KITOV, ZEEV V

ART UNIT

PAPER NUMBER

2836

DATE MAILED: 08/09/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

## Office Action Summary

Application No.

10/827,289

Applicant(s)

SUGIMOTO ET AL.

Examiner

Zeev Kitov

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 05 July 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1 - 6 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 - 6 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 April 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☒ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)                                   | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

Examiner acknowledges a submission of the amendment and arguments filed on July 5, 2006. An Office Action follows.

### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 2, 4 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Hobbs (US 4,857,818), Lange et al. (US 5,786,685) and Unterlass et al. (US 5,392,184). Regarding Claims 1 and 4, AAPA discloses following elements of the Claim: a rectifier circuit for converting into a DC power a first AC power inputted from an AC power supply, which includes a diode bridge (element 6 in Fig. 5) and a reactor (element 9 in Fig. 5) connected to an AC input side of the diode bridge and having a small inductance, with the diode bridge having a plurality of first driver elements (diodes 2 – 5 in Fig. 5); an inverter (element 10 in Fig. 5) converting the DC power from the rectifier circuit into a second AC power so as to output the second AC power to a motor (element 11 in Fig. 5), which includes a plurality of second driver elements (IGBT's in Fig. 5); a capacitor (element 7 in Fig. 5) absorbing regenerative energy of the motor, which is connected between DC buses of the inverter

and has a small capacitance. It further discloses the overvoltage protection circuit (elements 36, 37 and 38 in Fig. 9) connected between the DC buses of the inverter in parallel with the capacitor. However, the disclosed overvoltage protecting circuit is not of the type, which is activated prior to breakdown of the diode bridge elements. Hobbs discloses the overvoltage protecting circuit (element 50 in Fig. 1) connected between the DC buses (+ and – lines extending from rectifying bridge 18 in Fig. 1) in parallel with the capacitor (element 19 in Fig. 1, col. 4, lines 56 – 62) thus protecting the circuit from high voltage transients caused by the collapse of the magnetic field in the motor on shutdown. The overvoltage protecting circuit is inherently being activated prior to breakdown of the first driver elements of the diode bridge (diodes of bridge 18 in Fig. 1); otherwise it would not be able to protect the circuit including the bridge. In the circuit of AAPA Fig. 5, the overvoltage protecting circuit will be activated prior to the breakdown of the second driver elements of the inverter, since as well known in the art, speed of varistor reaction is fast enough to protect semiconductor elements from breakdown. As to a capacitor value, the AAPA discloses the prior art capacitor (element 7 in Fig. 5) as being small capacitance capacitor (see Drawings listing, page 7, lines 7 – 9).

Both references have the same problem solving area, namely driving the motor by invertors. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have modified the AAPA solution by replacing the regenerative transistor (element 37 in Fig. 9) by the varistor according to Hobbs, because (1) as Hobbs states (col. 4, lines 56 – 62), the semiconductor elements of the inverter and rectifier should be protected against breakdown from high voltage

transients caused by the collapse of the magnetic field in the motor on shutdown and (2) the varistor solution is simpler and has lower cost than AAPA Fig. 9, since it is one element only solution and the voltage detecting circuit (38 in Fig. 9) and switch control circuit (39 in Fig. 9) are not necessary.

In the AAPA alone, the diode bridge (32 in Fig. 9) and the inverter (10 in Fig. 9) are both protected against overvoltage by the voltage-protecting element (37 in Fig. 9). By the same token, in the AAPA circuit modified according to Hobbs, both the capacitor and the inverter are protected against overvoltage.

Another reference, Unterlass et al., is intended to illustrate a varistor characteristics and its behavior when it is connected in parallel to the capacitor. Since the varistor is a non-linear resistive element, so at predetermined voltage amplitude, the varistor very quickly begins conducting current and thus protects the capacitor from long-duration overload conditions (col. 4, lines 4 – 29). When the voltage across the capacitor (and the varistor) reaches the predetermined value (according to the varistor characteristics), the varistor substantially reduces its resistance thus absorbing the current, which otherwise would charge the capacitor to a higher voltage value.

Additionally, the primary reference does not disclose charging the capacitor up to a voltage lower than its breakdown voltage. Lange et al. disclose charging the capacitor up to a voltage lower than the rating voltage (col. 9, line 44 – col. 10, line 14). Both references have the same problem solving area, namely charging the capacitor through rectifier and limiting the capacitor voltage. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified

the AAPA solution by limiting the capacitor charging voltage such that it would not exceed the capacitor rating (or even worse) breakdown voltage. It is done so according to widely used in Electrical Engineering design rule of derating, i.e. setting the voltage of the capacitor or any other electronic component lower than its nominal rating voltage indicated by the manufacturer. The motivation for such setting is to increase its MTBF (mean time before failure) value, which is the main indicator of the component reliability. Violation of this rule reduces the component reliability and in the case that the charging voltage exceeds the component breakdown voltage it would be violation of basic design rules and standards.

Regarding Claims 2 and 5, Hobbs discloses the overvoltage protecting circuit formed by a surge absorber (element 50 in Fig. 1, col. 4, lines 56 – 62). As to motivation for modification of the primary reference, it is the same as above.

Claims 3 and 6 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted Prior Art (AAPA) in view of Hobbs, Lange et al. and Ruckman (US 4,571,656). As was stated above, AAPA, Hobbs and Lange et al. disclose all the elements of Claim 1. However, regarding Claims 3 and 5, they do not disclose a surge absorber and a gas arrester connected in series. Ruckman discloses the surge absorber and the gas arrester connected in series (elements 34 and 32 in Fig. 1). Both references have the same problem solving area, namely providing an overvoltage protection to the electrical equipment. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to have further modified the

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AAPA solution shown in Fig. 5 and 9 by adding the gas arrester in series with the surge absorber according to Ruckman, because as Ruckman states (col. 1, lines 44 - 58), the varistor has faster response time than the gas discharge tube and high power dissipation, while the gas discharge tube has the slower response time and the higher energy absorption; therefore their combination shown in Fig. 1 combines both fast speed response and high energy absorption.

### ***Response to Arguments***

Applicant's Arguments have been given careful consideration but they have been found non-convincing.

Applicant attacks the combination of AAPA, Hobbs and Unterlass references alleging: "in both Hobbs and Unterlass, the varistor is utilized to protect a capacitor, while in his invention, "the overvoltage protecting circuit is able to protect both the capacitor and the inverter" (page 3, 3<sup>rd</sup> paragraph). However, as indicated in the current Office Action, in the AAPA alone, the diode bridge (32 in Fig. 9) and the inverter (10 in Fig. 9) are both protected against overvoltage by the voltage-protecting element (37 in Fig. 9); in the AAPA circuit modified according to Hobbs, both the capacitor and the inverter are protected against overvoltage.


### ***Conclusion***

**THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zeev Kitov whose current telephone number is (571) 272 - 2052. The examiner can normally be reached on 8:00 – 4:30. If attempts to reach examiner by telephone are unsuccessful, the examiner's supervisor, Brian Sircus can be reached on (571) 272 – 2800, Ext. 36. The fax phone number for organization where this application or proceedings is assigned is (571) 273-8300 for all communications.

Z.K.  
7/30/2006



BRIAN SIRCUS  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 2800